67,036-003; B05541-AT1

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Beneditz
Serial Number:	10/060,043
Filed:	1/29/2002
Group Art Unit:	2836
Examiner:	Rios Cuevas, Roberto Jose
Title:	POWER DISTRIBUTION ASSEMBLY WITH REDUNDANT ARCHITECTURE

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

DECLARATION UNDER RULE 1.131

I, Kerrie A. Laba, state as follows:

1) I am a patent attorney, at all times representing the Applicant in this application, and responsible for its preparation and filing.

2) I have reviewed the disclosure documents and correspondence with the client concerning this application in preparing this Declaration.

3) The invention disclosure was prepared by the inventors on a date before the effective 35 U.S.C. 102(c) date of Heckmann, which is April 3, 2000. Exhibit A attached to this Declaration is a copy of an invention disclosure document that was completed prior to April 2000. The signature page is page 7 of the document, and each of the inventors has signed the disclosure. Dates on the signature pages and the dates on drawings included in the disclosure form have been redacted, but I have looked at these dates and all of the dates are prior to April 2000.

Additional work was done on the invention and a decision was made to have the concept searched in May 2001. Exhibit B attached to this Declaration is a copy of page 1 of a search report letter pertaining to the subject invention. In light of the search results, a decision was made to prepare and file a patent application. Diligence was maintained throughout the preparation and filing of the application. The subject application was filed on January 29, 2002.

4) I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Dated: July 23, 2004

Kerrie A. Laba

SUNDSTRAND

DOCKET NO. [redacted]
(Patent Dept. will supply)

INVENTION DISCLOSURE 67036-003

TITLE *(Be descriptive and specific)*: Secondary Power Distribution Assembly (SPDA) electrical architecture that provides for redundancy, flexibility, expandability and minimizes single point failure modes.

INVENTOR(S) *(Include middle name or initial)*:

INVENTOR NAME:	Bruce D. Beneditz	CITIZENSHIP:	US		
ADDRESS:	5548 Rural Edge Drive Roscoe, IL 61073	DEPT:	716	WORK PHONE:	394-3310
INVENTOR NAME:	Russell G. Stoneback	CITIZENSHIP:	US		
ADDRESS:	1157 Griggs Rd. Rockford, IL 61108	DEPT:	760	WORK PHONE:	394-3393
INVENTOR NAME:	Marc A. Bouton	CITIZENSHIP:	US		
ADDRESS:	5906 Covey Ridge Tr. Loves Park, IL 61111	DEPT:	760	WORK PHONE:	394-3414
INVENTOR NAME:	Ken Spear	CITIZENSHIP:	US		
ADDRESS:	[redacted]	DEPT:	760	WORK PHONE:	394-5611
INVENTOR NAME:	John A. Dickey, PE	CITIZENSHIP:	US		
ADDRESS:	1080 Hall Rd. Malabar, FL 32950	DEPT:	718	WORK PHONE:	394-2766

PROBLEM *(Describe the environment and motivation for the invention, being as specific as possible. Include specific projects, if any.)*:

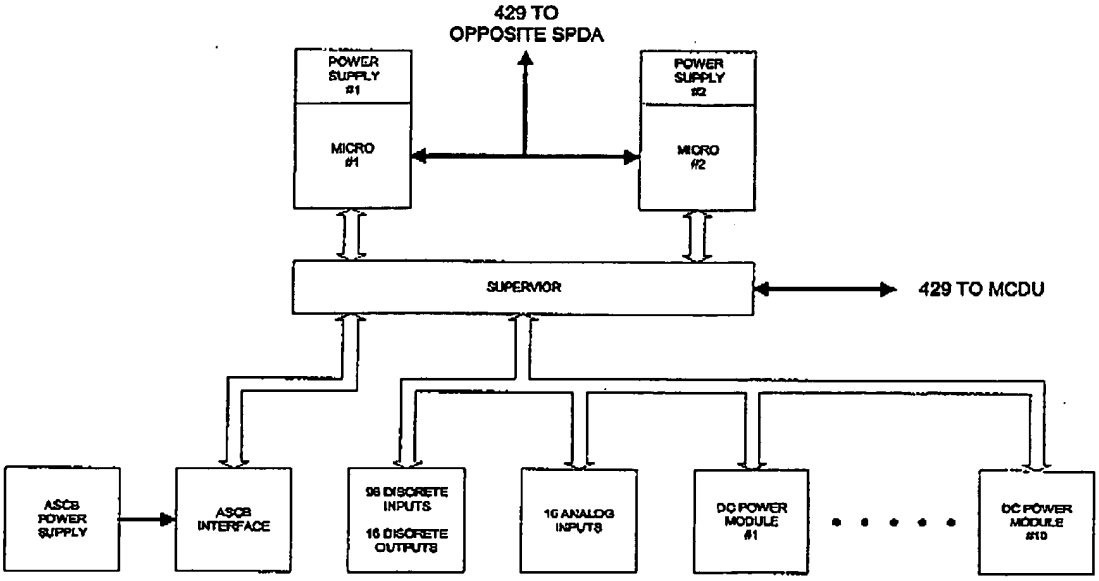
The problem with the electrical architecture used in the current family of Secondary Power Distribution Assemblies, SPDAs, is that it does not provide the flexibility and processing throughput to meet the needs of future applications. In addition, the architecture requires a significant redesign when other aircraft communication options need to be addressed. The goal is to provide a family of modules and chassis that can be applied to different applications without the need for hardware and packaging redesigns. The Invention Disclosure written by Bob Cooney in [redacted] and assigned the Docket No. B05531-AT1-USA addresses the mechanical packaging of an SPDA to allow for flexibility, expansion and reapplication. This disclosure addresses an electrical architecture that fits within that mechanical framework. Some of the specific problems that are address:

1. Single point failures of the supervisory logic (arbitrates between the redundant microprocessors).
2. Single point failures in the back plane of the SPDA.
3. In ability of the processors to monitor each other's health and report problems.
4. In ability to provide for input/output expansion via "slave" SPDAs. The slave SPDAs have no processing power, but are controlled by the master SPDA.
5. The bus structure and processor speed of the current approach can not support today's high-speed aircraft data busses.

EXHIBIT A

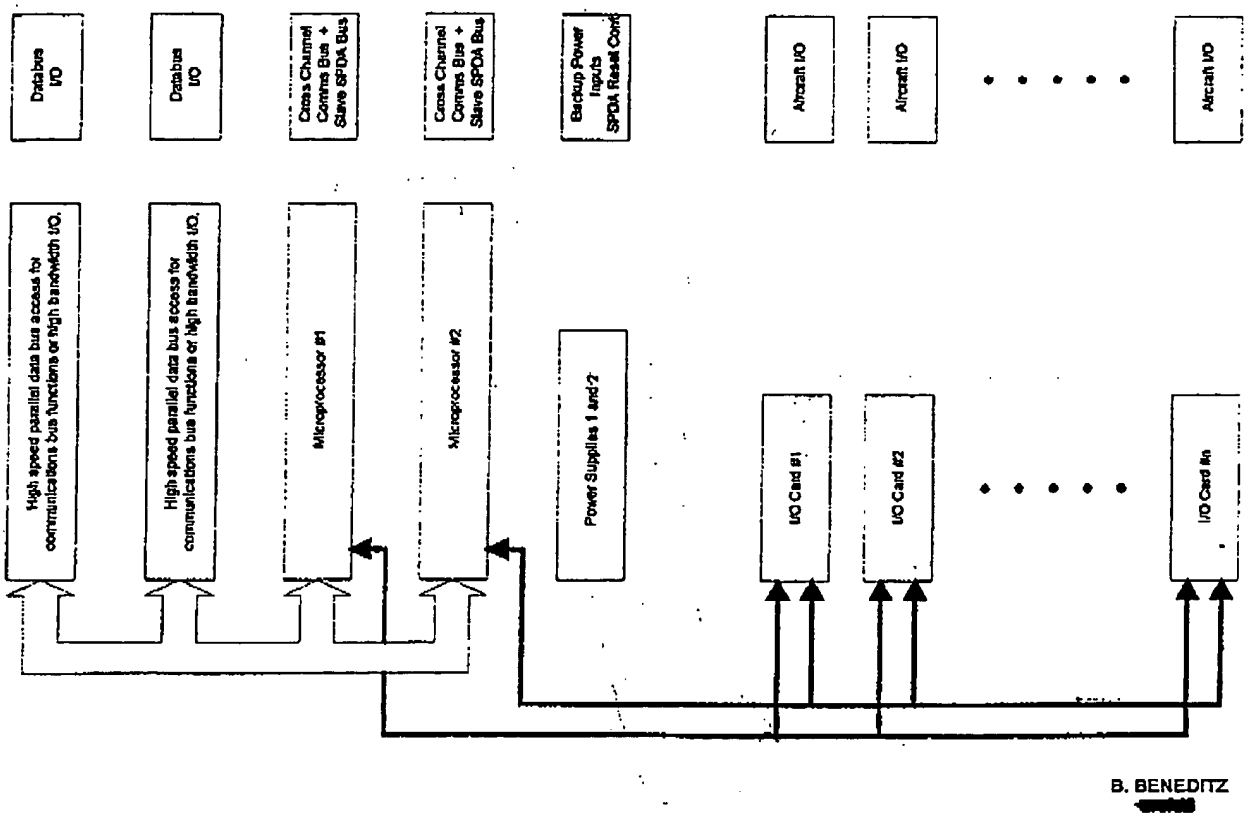
Old SPDA Approach

SIMPLIFIED SPDA BLOCK DIAGRAM
CURRENT APPROACH



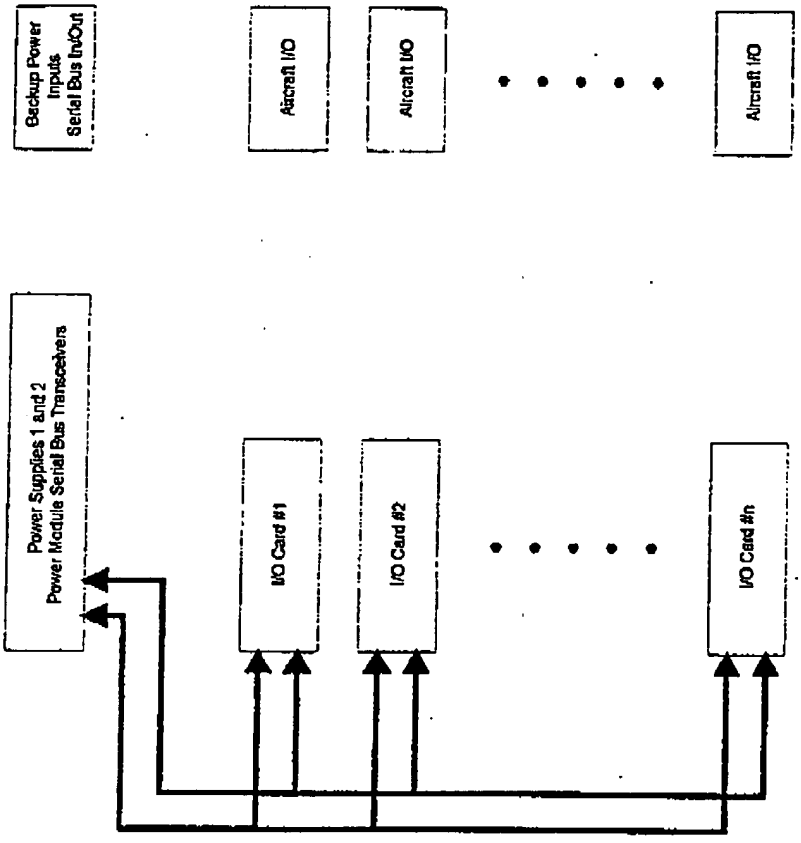
B. BENEDITZ [redacted]

MASTER SPDA CONNECTOR LAYOUT
PROPOSED APPROACH



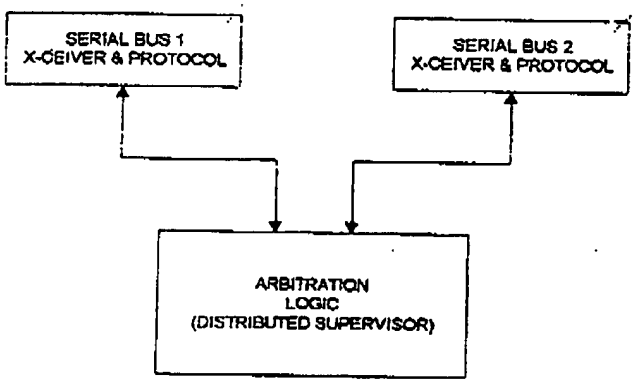
B. BENEDITZ

SLAVE SPDA CONNECTOR LAYOUT PROPOSED APPROACH



B. BENEDITZ

DISTRIBUTED "SUPERVISOR" FUNCTION PROPOSED APPROACH



* Functions similar to current supervisor.

* Transmit data and receive data from active micro.

* Transmit data only to standby micro.

* Active micro is the one that is providing command data.

* If both micros providing command data then default to micro 1.

* Provide status of off channel communications for BIT.

B. BENEDITZ [redacted]

DESCRIPTION OF INVENTION *(Please use reference numerals to indicate specific features on drawings. Use extra pages if needed.)*:

The invention is to provide a highly reliable integrated secondary power distribution system for application in aircraft and other vehicle electric power distribution systems. The purpose of the invention is to provide a distributed secondary power distribution system that is capable of supporting flight critical applications. The primary characteristic of the invention is a distributed architecture that prevents any single point failure from causing loss of control of more than one I/O module. This invention accomplishes this level of redundancy and reliability by the implementation of:

1. Dual microprocessors that are capable of health monitoring themselves and the opposite microprocessor. The microprocessors independently determine which one is operating in control and which one is the active backup.
2. Each microprocessor communicates with the I/O modules on it's own serial bus.
3. The I/O modules independently determine which of the two serial busses to use for control.
4. There is a shared high bandwidth parallel bus via which both microprocessors can communicate with a vehicle data bus. (In the event of a failure of this parallel bus or the vehicle data bus, the SPDA can receive redundant information from its complementary SPDA in the system.)
5. The serial busses that connect the microprocessors to the I/O modules can also be used to connect to remote I/O modules housed in a slave SPDA. (A slave SPDA is a chassis that houses I/O modules and a power supply. The intelligence for the use of data and control of outputs in the slave SPDA is provided by the microprocessors in the master SPDA.
6. Distributed power supplies for each of the I/O modules can further add to the mission reliability of the SPDA and provide for more efficient thermal management.

PRIOR RELATED DESIGNS, PATENTS, OR ARTICLES *(Include IEEE, SAE, or other articles, patent/disclosure numbers, assembly drawing numbers, and any other information to distinguish your invention over prior designs.)*:

[redacted]

ANSWERS TO THE FOLLOWING QUESTIONS ARE REQUIRED FOR PROCESSING THE APPLICATION. PROVIDE COMPLETE DATES (i.e., MONTH/DAY/YEAR) FOR ALL "YES" ANSWERS BELOW.

	YES	NO	DATE
1a. Has a model or prototype been built?		✓	
b. Has a model or prototype been tested?		✓	
c. If so, was it tested outside of a Sundstrand (or division) facility?			
2a. Was the invention made under government contract?		✓	
If so, contract number			
b. Was the invention made under a joint development contract?		✓	
If so, identify the parties			
3 Is the invention related to a license agreement?		✓	
If so, identify the parties			
4a. Has the invention been orally described, shown, demonstrated or exhibited to non-Sundstrand (or division) employees?		✓	
If so, to whom?			
b. Has the invention been shown or described to a potential customer or supplier?		✓	
If so, to whom?			
c. Has the invention been described in a proposal?		✓	
If so, proposal number			
customer			
d. Has the invention been advertised or described in any publication other than a proposal?		✓	
If so, where?			
e. Has the invention been shipped?		✓	
If so, to whom?			

5 If any event listed under item 4 or 1c above will probably occur in the future, identify the event(s) and estimated date(s): We may wish to apply the invention to the current Fairchild 728JET program. The invention will be proposed to Embraer for proposal support in the near future.

6. Are you aware of any proprietary information agreements relating to the above items? ✓
If so, identify parties

Please answer the following questions if known (Attach additional sheets if required):

I. Who are the primary customers (e.g., Boeing, Airbus, DOW, etc.)? Any vehicle power distribution system. This would include any Sundstrand customer.

II. What products presently incorporate the invention (777, compressor, pump, etc.)? None

III. What future applications will the invention likely to be used in? Any vehicle where integrated power distribution boxes are used.

IV. What area of technology is the invention related to (pumps, VF, controller, etc.)? Electric Power Distribution

V. What is the assembly, model, and/or part number where the invention is or will be used ?

VI. What is the division/enterprise where the inventor(s) is located? Sundstrand Aviation/Electric Power Business Unit

SIGNATURES:

Inventor: Bruce D. Bonnett — Today's Date [redacted]

Inventor: John A. Dinkey, PE — Today's Date [redacted]

Inventor: Russell M. Simcock — Today's Date [redacted]

Inventor: Marc A. Bastian — Today's Date [redacted]

Inventor: — Today's Date

Witnessed and understood by: Leland E Weber — Today's Date [redacted]

Print Name: Leland E Weber

Witnessed and understood by: John Buzzard — Today's Date [redacted]

Print Name: JOHN BUZZARD

KLW 4/14/98

EXPRESS SEARCH, INC.
2121 Eisenhower Ave., Suite 500 Alexandria, VA 22314
Phone: (703) 535-5455 • Fax: (703) 535-5475

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HAMILTON SUNDSTRAND
4747 Harrison Avenue
Rockford, IL 61108

Re: Patent Novelty Search
B05541-AT1-USA
Secondary Power Distribution Assembly Electrical Architecture that Provides for Redundancy, Flexibility, Expandabiltiy and Minimizes Single Point Failure Modes

June 11, 2001

Dear Mr. Mican,

In accordance with your letter of May 23, 2001, received May 30, 2001, a Patent Novelty Search of 12 hours was conducted at the U.S. Patent and Trademark Office for a means to provide a highly reliable integrated secondary power distribution system for application in aircraft and other vehicle electric power distribution systems, in accordance with the disclosure provided.

A manual search was conducted. Examiner Paladini, in Art Unit 2841, was consulted regarding the field of search. The following classes and subclasses were searched:

Class 307 (Electrical Transmission or Interconnection Systems)
Subs. 9.1, 18, 64, 125, 29, 17, 87, 38, 35, 66, 43
Class 700 (Data Processing: Generic Control Systems or Specific Applications)
Subs. 9, 296, 297, 293, 295
Class 363 (Electric Power Conversion Systems)
Subs. 37, 17, 65, 78
Class 323 (Electricity: Power Supply or Regulation Systems)
Subs. 235, 283
Class 361 (Electricity: Electrical Systems and Devices)
Subs. 63
Class 713 (Electrical Computers and Digital Processing Systems: Support)
Subs. 300

EXHIBIT B